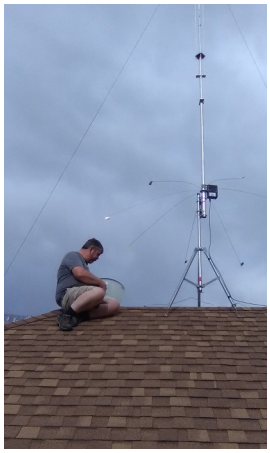
Issue 38

June 2021

Utah Valley Amateur Radio Club

The UVARC Shack

Dusting off our gear ahead of Field Day



Chad Buttars WE7CB, UVARC Vice President, conquers his roof by installing a Cushcraft R-9 HF antenna, and sets his sights on a fun summer.

In this issue of the *UVARC Shack*

The April club meeting featured Clint K6LCS, then Keith KB7M for our May meeting.

My Shack spotlights K8BKT. *Amateurs in Action* for a CW rescue. *Brass Tacks* on power supply selection.

Dear Annette answers a question about counterpoise on an EFHW antenna. *Hot Tips* explains how to correct others on the radio. *DIY* for a simple 20/40 trap dipole antenna. *The Amateur in You* on the updated exposure rules, and QRZ.com.

Please send your ideas, stories, questions, gripes, and photos to ***uvarcshack@gmail.com***

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Club meetings

Recap

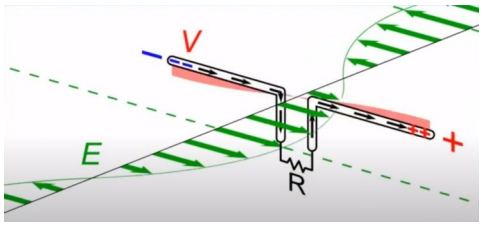
April 2021 club meeting – Satellite work made easy

Clint Bradford, K6LCS, presented a humorous and informative explanation and demonstration of working satellites with an HT or other low-power radio. This was one fun presentation!

Thanks to Clint for his time and preparation on this discussion, and to Trevor AG7GX for hosting and setting up the meeting at his work place. See the YouTube recording of the meeting and presentation.

May 2021 club meeting – Dipoles to dishes

For our May meeting presentation, Keith McQueen, KB7M, removed the mystery from how an antenna does its magic. He walked us through the rudiments of how a dipole works, all the way to bigger and more complex antenna types, without drowning everybody in tech speak.



Thanks, Keith for one of the most informative and engaging presentations we've ever had! You can see the YouTube recording of the meeting and presentation.

By the way, many of our past meetings are recorded and posted on the club YouTube channel.

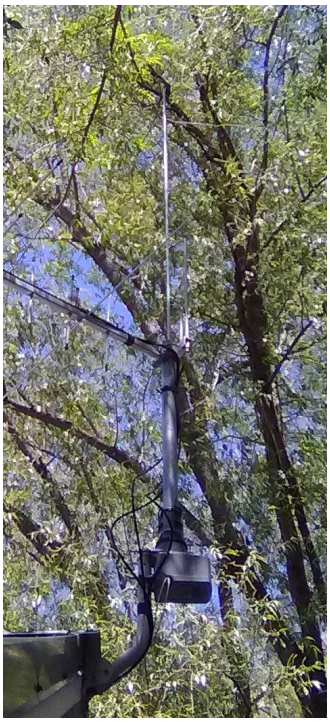
My Shack

Highlighting the shack (ham equipment and room) of a member, to give others an idea of the possibilities that might work for them

Kate Bowcut, K8BKT

It wasn't long after they were married, that Kate learned that her husband Chad KD7BKO was a ham radio operator. She would watch and listen in fascination as Chad would make contacts on his radio with people from Japan to Jamaica, on 10 meters. Kate had a lot of questions, but Chad never attempted to force radio onto her in any way.

At one point, Chad installed a Yaesu FT-7900R in her car, and told her she could listen with it, but to not transmit on it. Kate became familiar with many of the voices she heard, even though she hadn't yet met any of them. Eventually, the fascination became too much for Kate, and she decided to dive into online flash cards, which helped her understand some of the things that she saw going on with the radio.



Stealth antenna: Pockrus J-pole on Kate's roof

But Kate didn't just memorize words; she immersed herself in the exam material, mostly for fear of failure. In time, she took the one-day class at BYU from Steve Whitehead NV7V, and took the exam right afterwards, resulting in a near-perfect passing score.

That was 2012, and the 76ers were just coming into being. Chad didn't need to introduce Kate to some of the names she had already known from hearing them on the radio, but when she met Richard K7KGK, Carl WE7OMG, Nick KC2CU, and Doug WE7BBQ in person, she was inducted into the fold, as she recalls, the 6th female 76er.

For Kate, ham radio is a social medium, rather than a technical hobby or even emergency preparedness, but she does believe that she'd like to get a little more involved in EmComm as time goes on. She's such a "social bug" that she just had to attend an ice cream social, a week before Gabi, her first, was born. Nick was kind enough to pay her bill, which left her with an indelible impression of him, and of hams in general.

Today, most 76ers know Kate as the only feminine net control operator of those who make up the rotation on the weekly net. With a degree in counseling and an IT background, and after surviving COVID-19, she now works alongside Chad as a marketing and sales director for RapidFire IT, while he does the technical work. Kate's also involved in an upcoming reality show, which is scheduled to air in a few months.

— Thanks to all, and 73, Kate Bowcut K8BKT

Amateurs in Action

Recounts of ham radio operators who have used their time and skills to help others in a time of need

CW to the rescue

It was a terrific September Sunday for a QSO in 2008. Around 1 pm, Bob Williams N7ODM of Bozeman, Montana, got on 40 meters to get his rig ready for a scheduled CW contact with his brother in Spokane, Washington. While Bob was tuning and testing, he heard a faint but solid station tap out Bob's call sign: *N7ODM DE W7AU/7*

600 miles away, Russ Ruby W7AU of Corvallis, Oregon, was hiking near Buck Creek Pass in the Cascade Mountains of Washington. Things were going well until Russ slipped on a wet rock, fell, and broke his leg. Fortunately, Russ was carrying his tent, an Elecraft KX1, a wire antenna, and plenty of battery power. It was raining, so Russ set up his tent, climbed in, changed into some warm clothes, and snacked on some sunflower seeds and dried apricots. Afterwards, he strung up his wire antenna, set up his rig, and started tuning around.

He identified himself a Russ, provided information as to his GPS coordinates, the shelter, food, and water on hand, as well as his detailed physical condition. He told me exactly who I needed to contact for assistance, Bob reported. *Russ really had his act together.*

Russ and Bob kept in contact until around 8 pm, when Russ' signal started fading. Meanwhile, Bob had relayed Russ' condition, location, tent color, and other vitals to Snohomish County Search and Rescue (SAR). It was the first time Bob had ever helped somebody in danger by using radio. When SAR had finally reached Russ, they couldn't call in a chopper, due to inclement weather. It had snowed all night, and by the next morning, Russ' tent was covered. Russ and Bob made contact once more around 9 o'clock Monday morning, and SAR was able to get Russ off the mountain by horseback around 10:35 am.

Glenn Russell Ruby Jr, W7AU, of Corvallis, Oregon, broke his leg while hiking in the Buck Creek Pass area of the Cascade Mountains. His call for assistance was heard 600 miles away by Bob Williams, N7ODM, of Bozeman, Montana.

I just happened to be at the same frequency, Bob said. *It's just a stroke of luck that turned out great. It was quite an experience. I'm just glad that he was a ham radio operator, and that I was able to talk to him. It made the difference for him. What I did was nothing special. I'd like to think that any ham...would've done the same thing.*

Also, *It isn't the first time amateur radio operators have helped out with an emergency situation*, said Allen Pitts, ARRL spokesman. *Still, it's rare that Morse code is used to initiate a rescue. Knowing Morse code was dropped years ago, as a requirement, yet it's actually gained popularity since then.*

View the story on the ARRL website, on the Everett, Washington, Herald Net website, and on the Seattle PI website.

New Hams and Upgrades

New hams

KJ7WSI = Jared Barnes
KJ7WVQ = Adam Evans
KJ7WVU = Steven Ryant
KJ7WXO = Thomas McAdams
KJ7WYH = Darren Connors
KJ7WYI = Kobe Johnson
KJ7WYJ = Leanne Johnson
KJ7WYK = Scott Jones
KJ7WYL = Stephanie Noyce
KJ7WYM = Judy Warwick
KJ7YEZ = Rodney Newman
KN4MJE = Marc Ellison
KMØMRN = Yvonne Ellison
KJ7YGK = Lorell Hathcock
KJ7YGL = Kay Houser
KJ7YGM = Beth Lee
KJ7YGN = Michael Ririe
KJ7YGO = Katherine Scott
KJ7YGQ = John Sermon
KJ7YGS = Dustin Spencer
KJ7YGT = Lacy Spencer
KJ7YGU = Sherri Wilkins
KJ7YHW = Elnathan Eldredge
KJ7YIL = Adrienne Walker
KJ7YIM = David Walker
KJ7YJS = Robert Black
KJ7YNP = Mark Moore
KJ7YQK = Nathan Stewart
KJ7YRN = Brennan Clement
KJ7YRO = Christopher Holm
KJ7YVA = Gary Wilson
KJ7YVS = Hiatt Carroll
KJ7YVT = Melissa Clegg
KJ7YVU = Spencer Covert
KJ7YVV = Randall Eaves
KJ7YVX = Robert Huntington
KJ7YVY = Kurtis Meinhardt
KJ7YVZ = Bentley Myers
KJ7YWA = Kurt Myers
KJ7YWB = Jared Oldham
KJ7YWD = Andrew Sais
KJ7YWE = Sherrilee Smith
KJ7YWF = Amber Sweney
KJ7YWG = Eugene Tessier
KJ7YWQ = Michael Herron
KJ7YWY = Mara Gower

Upgraded hams

AE7HE = Helaman Fergusen (Extra)
N7AB = Michael Monsen (Extra)
KE7UIA = Gary Hutton (General)
KD7FCE = Erik Patterson (General)
KI7RES = Kiara Johnson (General)
KJ7UVW = Deborah Hart (General)
KØJXM = Jeff Ranck (General)
K7BTA = Stan Eriksen (General)
K9JFH = Jeff Hill (General)
K7OMD = Ed Paz (General)
W7ATD = Doug Tapking (General)
KJ7VQB = Jeremy Fitzgibbons (General)
KJ7VUT = Morgan Lindstrom (General)
KI7HBP = Michelle Costello (General)
WH6QV = Joe Costello (Extra)
KG7PXR = Gage Blackwell (Extra)
KI7AJU = TJ Dale (General)
KJ7YGL = Kay Houser (General)
N7PJR = Patrick Ricks (General)
N9EDN = Ed Nachel (Extra)

Congratulations to all these diligent folks! We look forward to hearing you on the radio soon. By the way, many of these General license upgrades are graduates of the recent Orem General Course.

Events

Upcoming happenings

In-person club meetings to resume in August

The City of Orem has given us the go-ahead to meet in-person as a club once again, in the City Council Chamber Room, 56 N State St in Orem. Starting Thursday 05 August, UVARC will return to in-person club meetings there. Face coverings and distancing are welcome, but not required. We still plan to live-stream and record our club meetings for those who aren't able to make it in person.

Unfortunately, we won't be able to meet as a club in the Orem City facilities until August, so the June club meeting will continue to be on Zoom and YouTube, and the July club meeting is up for discussion, as far as location, content, and attendance.

76ers Barbecue

Lynn Hancock K7LSH and Carl Pockrus WE7OMG have once again secured the pavilion at Highland Glen Park for our annual barbecue, this year on Saturday June 12, from 10 am to 3 pm.

If all goes as planned, we'll have a fox hunt, an HF station set up for you to get on the air, and a door prize drawing. If you'd like to contribute toward the food or door prizes, please alert Carl or Jeremy Giovannoni K7TEH.

The master chefs will be at it again, to serve up the grilled chicken. Plates, cups, utensils, and paper towels will be provided. Please feel free to bring a side dish, dessert, or drink for yourself and/or to share.

We hope by then we can remove our face coverings and shake each others' hands, but we'll have to play it by ear, and update you during the nets and on Facebook, over the next couple of weeks.

Field Day 2021

The Utah Valley Amateur Radio Club is planning to populate our favorite spot at Co-Op Creek north of Strawberry Reservoir once again. This will be noon Saturday June 26 through noon Sunday June 27. We start setting up on Friday June 25, so you're welcome to come join us for as much as you can or as little as you like, especially if you can lend a hand helping us get our antennas up. Same with take-down on Sunday.

Face coverings and distancing are welcome, but not required. More details as we get closer. Thanks!

The Ugly Antenna Contest

Yes, we're still planning to hold our first-ever Ugly Antenna Contest. Anybody can enter an antenna into the contest, but the owner must demonstrate that it can transmit farther than a city block on an amateur frequency. We'll have three judges who'll decide which working antenna is the ugliest. The top three will win prizes, but first place wins a used HF radio.

But we're going to need a place for it, so until we can secure one, the date is still up in the air. We're getting close, so stay tuned!

Brass Tacks

An in-depth look at a radio-related topic

Selecting a power supply

Being the proud owner of a ham radio, you're aware that you also need a way to power that radio. If your radio is an HT (handheld transceiver), chances are, it was packaged with a rechargeable battery pack that lets you take the HT wherever it's reasonable to use one. But if your radio is a mobile or base radio, it's likely going to require a power source that's external to the radio. We refer to that power source as a ***power supply*** or *PSU* (power supply unit), and that external PSU can be one of several kinds, depending on your power requirements and usage.

The purpose of a power supply is to convert some form of energy into electrical energy that your radio and other equipment are designed to use. As will be discussed, there are a number of energy sources that must be converted into electrical energy, for them to be useful to us, but our focus will be the conversion of household AC (alternating current) electricity into DC (direct current) electricity that your equipment requires. To make an informed decision about the types that are appropriate for your equipment, let's break down the choices into the most popular types, and go from there.

Before you go searching for a PSU, however, the first two most important parameters you'll need to arm yourself with, are the ***voltage requirement*** and the ***current requirement*** of the equipment you're attempting to supply power to. I'm going to omit the *power requirement* because that often leads to confusion between the power specification of the radio and the power capability of the PSU, as I'll explain later.

Most modern ham radios specify 13.8 volts for a supply, plus or minus 15%, which will range from 11.73 volts to 15.87 volts. This means a power source that presents 12 volts will work fine for most rigs, but might leave little margin, depending on your rig's current demand. In fact, you might find that most 12-volt batteries will charge to around 13.5 volts when they're fully charged, so the 12-volt range will be our nominal (meaning *by name only*) voltage starting point.

Power supply types

There are basically three types of desktop power supplies that hams use, to provide electrical energy to their radios. These are *linear power supplies (LPS)*, *switched-mode* (nicknamed *switching*) *power supplies (SMPS)*, and *batteries*. There are definitely others, but these three tend to be the ones hams use most.

Linear power supply

A *linear power supply*, like the one pictured above, is called such because the output voltage is converted proportionally (linearly) from the input to the output. Its input is typically household AC into a step-down transformer, which can make the PSU relatively heavy, especially if the load at the output requires a large, steady current. Once the voltage is stepped down, it's fed

Brass Tacks

continued

into a bridge rectifier, which converts the AC into rippled DC.

The DC is then filtered by capacitors and resistors, such that the RC constant is much larger than the time it takes for the signal to drop back to zero, resulting in a large reduction of the ripple. Because of the dependence on the time constant, the larger the capacitors, the longer the time constant, and therefore the smaller the ripple. The resulting voltage is then further filtered through a regulator for a consistent output.

The internal circuitry of a linear PSU tends to be very simple compared with that of a switching PSU. This leaves very few parts that can fail, and as a result, most linear PSUs have a legacy of reliability, and last a lifetime or more. On the other hand, beside the weight, there are other disadvantages to linear PSUs, including typically high cost, bulky size, audible transformer hum, heat dissipation, and relative inefficiency when compared with that of switching PSUs.

Switched-mode power supply

A *switching power supply*, as we often call it, works by rectifying and filtering the input AC house current, then uses (typically MOSFET) transistor switching to turn the voltage into a high-frequency (10 kHz to 1 MHz) pulse. The pulse is stepped down by a transformer, then rectified and filtered once more through a regulator at the PSU output.

As mentioned, the switching PSU has many advantages over a linear PSU, including size, weight, cost, and efficiency. But its greatest drawback is noise. Not audible noise, but RF (radio frequency) noise, generated primarily by the switching circuitry. Once a major concern when supplying power for amateur radio equipment, most modern switching PSUs tend to have very robust noise filtering designed into them, practically eliminating that disadvantage.

Battery

A *battery* is an electrical storage device that's typically portable, and can be used through one lifetime (*Primary Type*) or many (*Secondary Type*), and provides a very steady power source. Secondary batteries must be recharged, by either a power supply or a solar panel. Non-rechargeable batteries cannot be recharged, and so can only be used until its charge is exhausted. While often conveniently portable, the focus of this discussion is on power supplies that convert commercial power to DC power, so we'll address using batteries as a portable power source on another day.

Brass Tacks

continued

Power supply applications

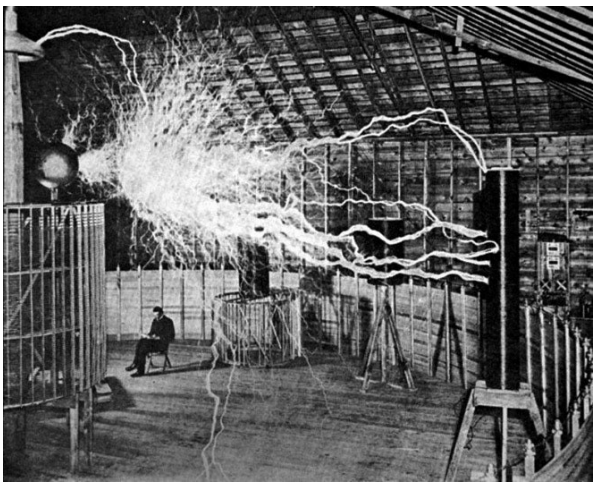
The power supply you select will depend on your application, and the two largest application concerns tend to be whether your equipment should be *home-based* or *portable*. Home-based gear is typically installed somewhat permanently in your home, be that your house, your apartment, or your RV. Portable gear is typically installed in a vehicle or not installed at all, but might be carried in your vehicle from once place to another. Still, many find it useful to install some gear permanently, with the option of quickly disconnecting it for portable operation.

Those who install radio gear in a vehicle often supply it with power from the vehicle battery or other onboard power system. However, many choose to bring an external power supply that they can plug into an outlet at a pavilion, in their travel trailer, or on a generator. Instead of lugging a heavy linear PSU between home and vehicle whenever it's time to hit the road, most who bring along an external PSU find it a lot more convenient to use a switching PSU.

Power supply features

Since we've already established the fact that your radio gear requires 12 nominal volts (13.8 specified volts) from the PSU to operate properly, perhaps the next most important feature in a power supply is its current capability (*amperage*). To determine what capacity of PSU you need, you first need to understand the current requirements of your gear, then add about ten percent for *inrush current*, which is the *peak current draw* (also called *surge*) when you first power up the devices or when you key up your rig at full power.

For example, say you want to power an **Icom IC-7300** (21 amps), an **LDG AT-100proII** tuner (½ amp), a **Daiwa CN-901HP** external SWR meter (½ amp), and a **Yaesu FTM-400DR** (½ amp) mobile radio simultaneously, assuming you won't be transmitting on both rigs at the same time. That adds up to 21 amps + ½ amp + ½ amp + ½ amp = 22.5 amps. Add ten percent (2.5 amps) for inrush, to give you 25 amps peak. This means you're going to need a PSU capable of supplying 22.5 continuous amps and 25 peak amps. The Powerwerx SS-30DV and MFJ-4230MVP switching PSUs both supply 25 continuous amps and 30 peak amps, and so will probably meet your requirements, if this is your setup.



There are occasions in which your current needs might be rather large, like that for an amplifier, or for a larger array of equipment that must be powered all at the same time. In those cases, you might need to select a linear PSU, such as the Astron RS-50M (37 continuous amps and 50 peak amps) or even the Astron RS-70M (57 continuous amps or 70 peak amps), because there are very few switching PSUs available, capable of providing that kind of current, especially for a reasonable price.

In our entire discussion, we haven't discussed the power requirements of your equipment or the power capability of your PSU. On one hand,

Brass Tacks

continued

the power requirements of your gear can easily be calculated as (total amps required) x (13.8 volts). From our example, we see that we'll need to supply a maximum of (25 amps) x (13.8 volts) = 345 watts of power.

On the other hand, if you were to purchase a 350-watt power supply, it might not meet your requirements, since those "350 watts" might refer to the *power consumed*, rather than the *power provided*, the difference (actually, the ratio) being what we call *efficiency*. This means that if the power supply type is 75% efficient (typical for many linear PSUs), you'll require a (345 watts) ÷ (0.75) = 460-watt PSU to actually provide your equipment with the power it needs. So, judging a PSU by its *current* capability is typically a more consistent and convenient yard stick than its power rating.

Other PSU features include meters, voltage adjustments, protection circuitry, pretty enclosure, external connectors, bells, and whistles. While short-circuit ("crowbar"), or high-current protection is important, the other features might simply be a matter of choice. Also, the external connector type can be a great source of convenience or frustration, depending on your needs. Many PSUs present two-terminal binding posts, often with banana plug options. Because an increasing number of hams are becoming aware of them (and because they've become an ARES standard), many tend to install *Anderson Powerpole connectors* on their PSUs, if they aren't already equipped with them.

Anderson Powerpoles

Powerpole connector

Other power supply options

There are many ways to supply electricity to your equipment from commercial home power. Besides the ones we've discussed (primarily linear PSUs and switching PSUs), some rely on AC adapters (also known as *wall warts*), which tend to provide low current DC. Some use laptop or game console power supplies, which tend to supply a little more current.

Many have also turned to solar (panels, charge controllers, batteries, etc.) for viable permanent or portable power solutions, but once again, the focus here is on the conversion of commercial AC power into equipment DC power.

Common wall wart

Brass Tacks

continued

Quickly gaining popularity is the inexpensive computer PSU, which is a clone of the Megawatt S-360-12 switching power supply. Depending on when you make your purchase, you might end up with one that's either perfect, generates RF noise, or has a noisy fan, a kind of hit-and-miss power adventure.

Many have experimented by building their own power supplies out of "ATX" computer power supplies, which can often provide a lot more current than laptop or AC wall adapters. Most of these ATX types focus much of their output on +5 VDC, and are often lacking on the current output for +12 VDC. Still, it's an educational, practical, and fun exercise, and you'll get a power supply out of it.

Computer "ATX" power supply

Final recommendations

In the end, you'll need to find the power supply that suits your needs and situation best. Assuming your equipment requires a nominal 12 volts, your job is to total the amount of current required by all of it, then add ten percent to calculate the maximum required current. Match that requirement to a PSU that can supply *at least that much current continually*.

Here are a few store-bought power supplies I recommend, to power your ham radio gear, as of the date of this publication. There are other good ones on the market, and many good ones have come and gone, but at this time, these are the biggest bang for your buck, IMO:

Powerwerx SS-30DV ($120) 25 A / 30 A [SMPS]

MFJ MFJ-4230MVP ($120) 25 A / 30 A [SMPS]

Samlex SEC-1235M ($145) 30 A / 35 A [SMPS]

MFJ MFJ-4245MVP ($150) 40 A / 45 A [SMPS]

Alinco DM-330MVT ($170) 30 A / 32 A [SMPS]

Astron RS-50M ($370) 37 A / 50 A [LPS]

Astron RS-70M ($380) 57 A / 70 A [LPS]

MFJ-4275MV 75-amp PSU

To avert any potential questions about them, notably missing from this list are the RandL RLPS30M, TekPower TP30SWI, JetStream JTPS31MA2, and MFJ MFJ-4275MV. I don't believe they are bad products in any way; I simply can't recommend them because I'm unfamiliar with them. Maybe you can investigate these, and others, then let me know what you find about their reliability versus their costs.

Noji Ratzlaff, KNØJI (kn0ji@arrl.net)

Dear Annette

What's on your mind? Serious, humorous, technical, and thoughtful answers to your deepest, (mostly) ham-related questions.

Dear Annette:

I have a Sigma Euro-Comm vertical HF antenna installed on my fire escape railing, and I've made a lot of contacts with it, but a few people tell me it's a dummy load. What is a dummy load exactly, and should I be concerned?

Barry in Coalville

Dear Barry:

A ***dummy load*** is a passive test device used in place of your antenna or antenna system, and ideally presents a perfect 50 ohm impedance. Because it typically doesn't (indeed, not supposed to) perform well as an actual antenna, some might refer to a poorly performing antenna tongue-in-cheek as a dummy load. No matter what kind of antenna you're using, if it works for you, then that's what matters.

Dear Annette:

Does an EFHW antenna need a counterpoise?

Gary in Orem

Dear Gary:

Every antenna needs a counterpoise to work properly, and an EFHW (end-fed, half-wave) antenna is no exception. In the case of the EFHW antenna, if you do not install a counterpoise of your own choosing, it will use something else to provide that other path. And if you're using coax as your feed line, that other path will likely be your coax shield, possibly resulting in common-mode current, which can often manifest as shack RF.

Dear Annette:

I bought two solar panels online for a steal, but they didn't come with any instructions. Should I connect them in series or parallel to charge my 12 V Bienno LiFePO battery?.

Don in Orem

Dear Don:

The honest answer is to connect them exactly as the panel manufacturer recommends, including to an appropriate charge controller. If your panels did not come with any documentation, online or paper, I would return them for ones that did. It's true that today's off-the-shelf solar panels have *somewhat* standardized on a 19 VDC open-circuit voltage, even if they're advertised as "12 VDC," but that by no means applies to all of them. If you set up your panels without knowing how, they might work really well for you. If they don't, the results can be anywhere from mild disappointment to a house fire.

Dear Annette:

I've seen ham radio ads for 2 kW amplifiers, and I've even heard of hams who have them, and even higher power amps. Isn't it illegal to own those, since hams can only use 1.5 kW?

Zack in Nephi

Dear Zack:

It's not illegal for an American-licensed ham to sell or own an amplifier capable of an output greater than 1.5 kW, so long as the output power is kept under the legal limit, which can differ between bands. One reason for using, say, a 2 kW amplifier is to overcome *gain compression*. As your amplifier output power approaches its saturation limit, it can start to produce distortion, due to the resulting nonlinearities of gain compression, further causing splattering, harmonics, and spurious emissions. This way, with a 2 kW amplifier, your (almost) entire 1.5 kW range will be confined to the linear region.

Got a question for Dear Annette*? Email it to* ***uvarcshack@gmail.com*** *and include your town name. Sorry, no guarantees.*

THE AMATEUR

The Amateur in You, Part 1

What have you been pondering?

The updated RF exposure rules

Recently, the FCC has published an update to their RF (radio frequency) exposure compliance requirements. To be clear, the allowable RF exposure limits haven't changed, but the need to prove that your station meets those limits have. Previously, specific types of typical amateur radio setups were exempt from the need to demonstrate compliance with the exposure rules, but now the exemptions are made based on your ability to show that your station doesn't need an evaluation. However, the evaluation for the non-exempted stations is simple for most installations.

Step 1 : Determine whether your station is exempt on one band

Assuming the worst-case (no feed line or instrumentation loss) power output, start with the ***maximum power level your radio can output*** on the band of choice. If that amount is less than the amounts listed in this table for the selected band, then your station is exempt from further evaluation, and you simply need to fill out Worksheet A of the FCC form ***for each band on which you plan to operate*** that station, then ***repeat this for each radio***. File away these worksheets, as proof of your exemptions.

Band	Max (W)	Band	Max (W)	Band	Max (W)
160 meters	500	20 meters	225	10 meters	50
80 meters	500	17 meters	125	VHF	50
40 meters	500	15 meters	100	70 cm	70
30 meters	425	12 meters	75	33 cm	150

Step 2 : Perform the evaluation for your station on one band

First, divide the power level from Step 1 by 4, to calculate your reasonable worst-case ***average power*** on the band of choice. Next, research the ***gain of your station antenna***, which might not always be easy. Then, use either the Lake Washington calculator or the VP9KF calculator, to enter the average power, the antenna gain, and the highest operating frequency in MHz of the band in consideration. Using the VP9KF calculator, you can also specify the distance of your antenna to humans, and immediately learn whether your station is in compliance, by a "Yes" or "No" in the results.

Fill out Worksheet B of the FCC form ***for each band on which you plan to operate*** that station, and file away the worksheets, as proof of your compliance evaluations. For Step (G), use 50%, for Step (H), use 3/6 = 50%, and for Step (I), use 15/30 = 50%. If you find that your station is not in compliance, you can re-run the evaluation by inserting more realistic values.

While the updated rules went into effect on 05-03-2021, the compliance worksheets are due on 05-03-2023, in case they are ever requested.

Noji Ratzlaff, KNØJI (kn0ji@arrl.net)

The Amateur in You, Part 2

What have you been pondering?

When you received your FCC license, a website known as QRZ.com (or simply, *QRZ,* and pronounced ***cue-are-zed***) created a web page as a courtesy to you, free-of-charge, containing only information it gleaned from the FCC public record. It provides a convenient way for other hams to look up your name, home location, and license class. QRZ also displays your email address, your photo, and a personal description, if you've populated your page with those.

Create a login

As a new ham (or even if you've been around a while), it's in your best interest to create a login on QRZ, to help people know how to contact you off the air. After you do, you can use QRZ to look up other hams quickly, find how to contact them, and see their photo and biographical info if they've posted it.

Use QRZ for searching

You can use QRZ.com to search for other hams by call signs, names, or location. In the search box, you can enter a complete call sign, to display that person's QRZ page. You can even enter a partial call sign and a wildcard character ("*") to search for a group of call signs. For example, you can list all hams that have call signs starting with "KJ7" and ending with "H" (because, maybe, that's all you heard on the air), by simply entering "KJ7*H" in the search. You can list all hams named "Steve" who live in "Provo" by entering "Steve Provo" in the search, then select *by Name/Addr* in the drop-down.

Use QRZ for logging

You can log your contacts using QRZ.com, for any amateur band. It's a convenient way to keep track of friends, special events, and faraway stations you want to record permanently. People who look up your QRZ page will be able to see your contact list, a feature no other logging program provides. (It's an easy way to show others the contacts you've made.) And when the appropriate contacts are confirmed, QRZ will display the associated award (WAS, WAC, Grid Square, etc.) at the top of your page.

Use QRZ for a flea market

QRZ.com has an online garage sale, of sorts. You can post your own ham radio equipment for sale, or peruse the thousands of used items for sale by others. Hover the Swapmeet tab, then select *Ham Radio Gear for Sale* to display the world's largest listing of ham radio equipment for sale. Be sure to look over this guide before launching into a buying frenzy, however.

There's more

QRZ.com is probably the largest repository of call signs in the world. It was made originally for American call signs, but today contains the call signs of numerous hams from many countries. QRZ also posts announcements, alerts you when your license is about to expire, and contains a popular forum.

Paid subscription

It's not actually required of you to pay QRZ for your page on their website. But available only through a paid ($17 annual) subscription, they have many useful features, such as unlimited call sign lookups, the online Swapmeet, and the Web Contact Log.

Hot Tips

Good info for the new ham, and old stuff to refresh your memory

Correcting others over the radio

You might have been listening to two people talking on the radio. Things were going well, but suddenly you noticed that one of them made a mistake. He accidentally said, "10-4" or he said, "broadcast" instead of "transmit" or he let loose with a swear word, or he hadn't given his call sign in eleven minutes. For some of us, our inclination might be to jump on and let the person know what he did wrong, because we are *righteous*, we know best, and we're trying to *set the record straight* by casting that first stone.

Alright, that's a little extreme, but we do find that, occasionally, we feel the need to correct somebody's mistake in front of two hundred other listeners. Still, is there ever a time when it's appropriate to correct somebody over the radio? Well, yes, especially if the facts being conveyed might hold some significance, and it's important that all listeners understand the correction, like the time or date of an important event, or the address of an incident, or a life-threatening detail omitted from a verbal report.

Leave the correction to others

The first rule to correcting others on the radio is, ***just don't***. If the information you're attempting to correct is not that important, or the correction can be made by somebody else, just let it go. Chances are, the person who made the mistake already knows he made the mistake. You're not the ham police, and he's likely not a ham criminal. Furthermore, you should decide by your listening audience, whether ***you are the person*** who should announce the correction, or leave that to somebody else, whose job that is.

Is the correction really necessary?

The second rule is to ***use good judgment***. Ask yourself whether this is a correction that really needs to be made, especially in the earshot of many others. On one hand, it's easy to justify making a correction about a vital piece of information that was announced inaccurately, such as a phone number, a medical need, or the name of a contact official. On the other hand, if a person accidentally uses a CB or police term, did not leave much space before he keyed up last time, or sings a stanza of "Happy Birthday," it's probably best to overlook and ignore the terrible offense.

You're just being helpful

Sometimes, you might want to announce the correction in the spirit of being helpful, like "I believe your WIRES is turned on" or "Sounds like your battery might be running low," or "Could you repeat your call sign phonetically?"

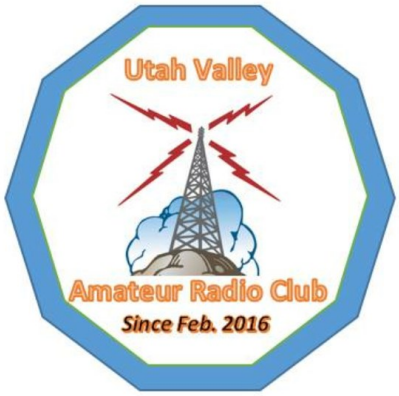
If you need to correct somebody, and the rest of the amateur radio population needs to hear it, proceed to make the correction using only facts, and do so tactfully. If you lack the social skills to make corrections in a kind and gentle way, be patient, and let somebody else make it. It's an art form that takes a little practice to get right. Also, it's easy to blur the line between correction and criticism, so make your suggestion without criticizing the person. Instead of "You sound terrible," maybe say, "I only caught about half of that last transmission."

My bad

Finally, if you're the person who made the mistake, accept the correction with humility, take ownership of the problem, and freely admit to your mistake, if it's appropriate. Avoid making excuses, like "Nobody's perfect," and never retaliate, like saying "Well, *your* audio sounds just as bad." ***Be the bigger adult***, thank the person who gave you the correction, and let it end there.

DIY

Worthwhile projects you can build on your own



Trap dipole antenna for 20 and 40 meters

Similar to what I had built two years ago, I thought I'd present another dual-band HF dipole antenna, for 20 meters and 40 meters, but this time using a single wire pair, instead of two pairs of elements. But doing so requires me to make for each dipole side what's known as a ***trap***, which is nothing more than a tank circuit (capacitor and inductor in parallel) made out of coaxial cable and PVC.

The trap allows signals of all frequencies to pass through it, except those around 14.175 MHz, which is close to the center of the 20-meter band. So, a 20-meter signal will become attenuated (stop at, not pass through) the trap, but a 40-meter (and 10-meter, 80-meter, etc.) signal will go straight through the trap, as though it didn't even exist.

Furthermore, the length of the elements between the balun (transformer-less center insulator, actually) and the trap present a near-50-ohm impedance to the rig at 20 meters. And the length of the element on the other side of the trap presents a near-50-ohm impedance at 40 meters. Therefore, the rig will treat the antenna as though it was both a 20-meter antenna and a 40-meter antenna.

Parts list

60 feet of 14 AWG stranded wire

Two 1-¼″ PVC slip caps

Three 1-½″ x 3/16″ eye bolts

One SO-239 bulkhead connector

#8 screw, nuts, flat washers, split washers

6″ 16 AWG speaker wire pair

One 1-¼″ 24″ long PVC tube

Twelve 16 AWG #8 stud ring terminals

6 feet of RG-58 coax (for the traps)

4 each M3 screws, split washers, nuts

Two dogbone insulators (you can fabricate these from ½″ PVC, about 3″ long each)

Transformer-less "balun" construction

Drill a 3/16″ hole in the center of one of the slip caps, and install an eye bolt through a flat washer on the outside of the cap. Slip another flat washer onto the eye bolt on the inside, followed by a split washer, then tighten a nut onto the eye bolt of the slip cap assembly and set aside.

Drill a 7/16″ hole in the center of the other slip cap. If your slip cap is domed (most are), rather than flat, it'll help with the installation to sand the outside of the cap so that the entire flange of the SO-239 bulkhead sits flush with the cap. Insert the solder end of the SO-239 bulkhead into the 7/16″ hole on the outside of the cap, and using the mounting holes of the bulkhead as a template, drill a 1/8″ hole for each mounting hole. Drill two more 1/8″ holes in

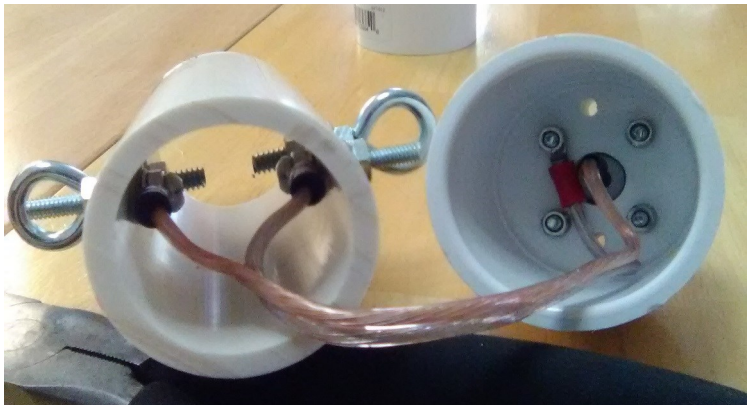
DIY, continued

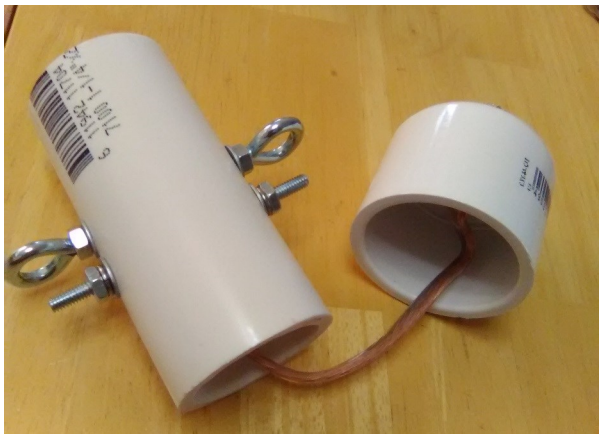
Trap dipole antenna for 20 / 40 meters

the slip cap next to the SO-239 bulkhead flange, to allow for drainage of rain water that might collect inside the balun.

Strip both sides of each end of the 6″ speaker wire pair. Solder a #8 ring terminal to each conductor of one end, and a #4 ring terminal to one of the conductors of the other end. Slip a piece of heat shrink tubing over the remaining conductor, then solder it to the center pin of the SO-239 bulkhead, and shrink the tubing. Use the metric screws, washers, and nuts to bolt the SO-239 bulkhead to the slip cap, including the #4 ring terminal to one of the screws inside of the cap.

Cut a 3-½″ section off of the 24″ PVC tube. Drill a 3/16″ hole in the side of the PVC tube 1-½″ from one end, which I'll refer to as the *top end*. Drill another 3/16″ hole just ½″ below the top hole, placing it 1-½″ from the *bottom end*. Slip an eye bolt through a flat washer into the top hole, and tighten a washer and nut to it on the inside. Screw a nut onto a 1″ #8 screw, and slip the pair through one of the #8 ring terminals of the speaker wire, then through the bottom hole from the inside. Tighten a nut and washer onto the screw assembly from the outside. Repeat these two on the opposite side. Place the two assembled caps onto the tube, and the balun is complete. Once you make sure the connections are continuous, you're free to glue the caps on.

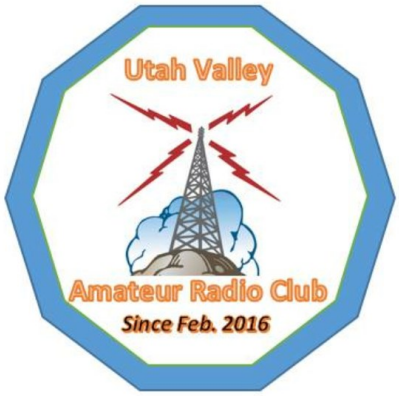




Completed "balun"

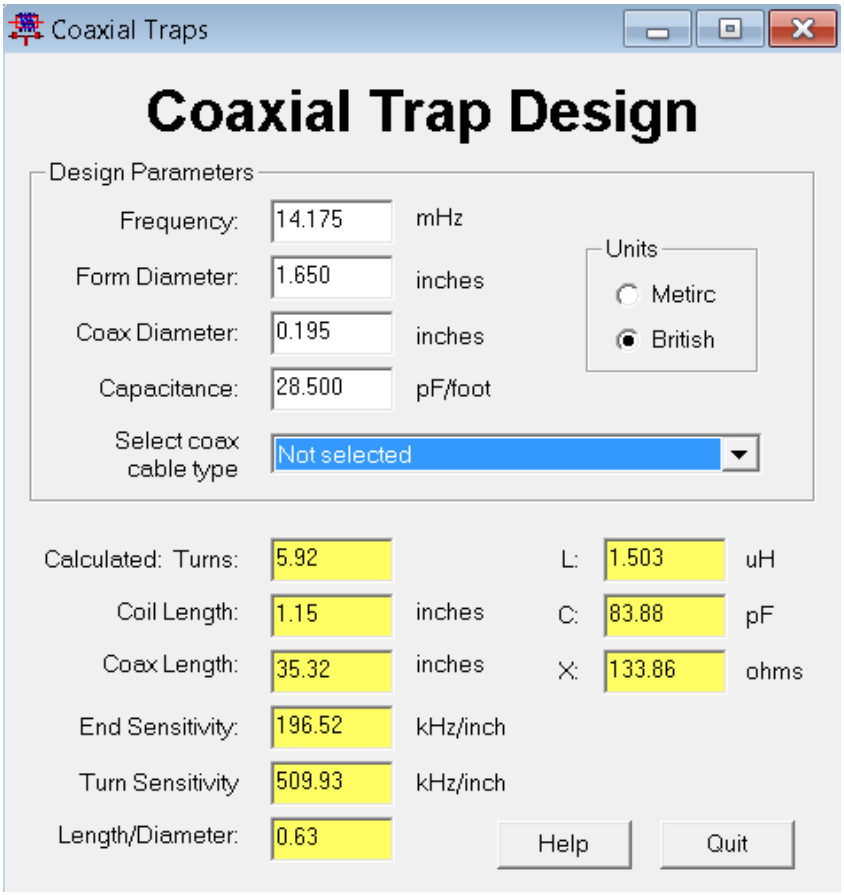
DIY, continued

Trap dipole antenna for 20 / 40 meters

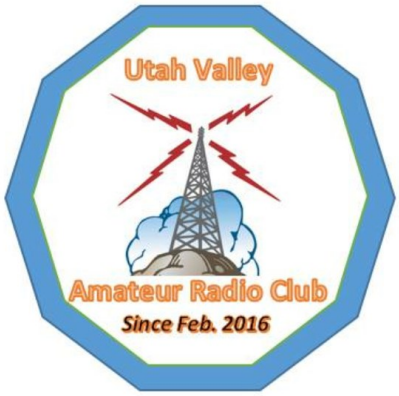


Trap construction

To construct each trap, start with a couple of known quantities, which are the 1-¼″ PVC tube (with an outside diameter of 1.65″) and some RG-58 coax. Using those, and the trap resonant frequency of 14.175 MHz, input those parameters to a coax trap calculator, such as that by Tony Fields VE6YP. This calculator displays the following:



The length of each trap tube needs to be about 0.2″ x 6 turns = 1.2″, plus an inch on each side of the coil for connections, = 3.2″, so cut two 3-¼″ sections of the PVC tube for the traps. Drill a 7/32″ hole about 1″ from the end. Insert about four inches of coax into the hole from the outside, then tightly wrap the coax around the tube 5.9 turns.



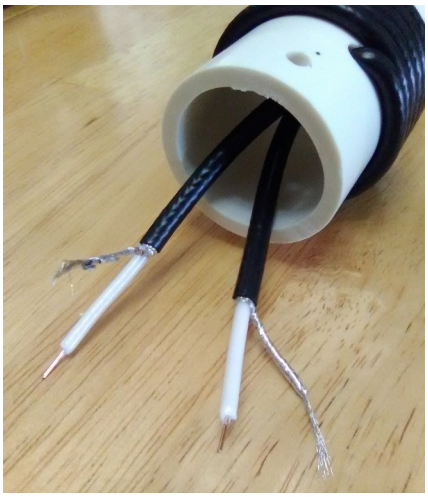
DIY, continued

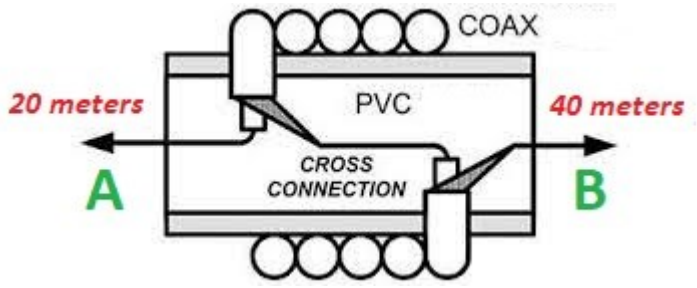
Trap dipole antenna for 20 / 40 meters

Mark on the tube where that 5.9-turn point is, then unwrap and remove the coax from the tube. Drill a second 7/32″ hole at the mark. Re-insert the coax into the first hole, and tightly wrap the coax around the tube, cut the coax with about six inches of slack, and insert the newly cut end into the second hole to secure it.

Drill two 3/16″ holes about 3/8″ from each end, inline with each other, but between the two coax entry holes. Route both coax ends through one tube end, which I'll call "A" for convenience, and the other end "B". Also drill two 1/8″ strain relief holes opposite the circumference of the two 3/16″ holes.

Below is an illustration of what we're trying to accomplish in building each trap. Essentially, we're connecting the braid of the 20-meter end to the center of the 40-meter end, connecting the remaining ends to the antenna.



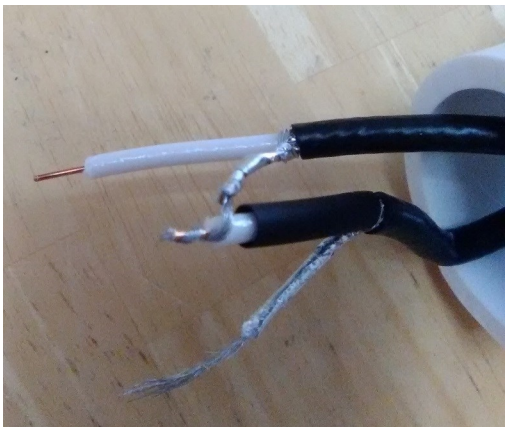


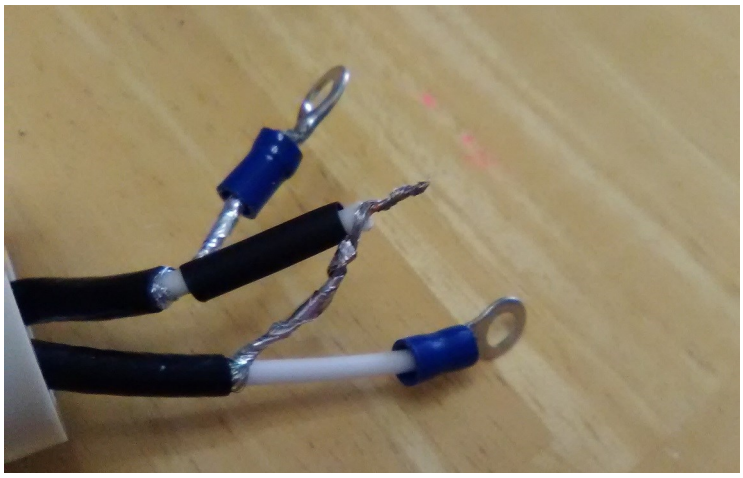
Cut off all but three inches of each coax sticking out of the tube, strip the coax, twist the braid together, and cut off the foil, if any.

DIY, continued

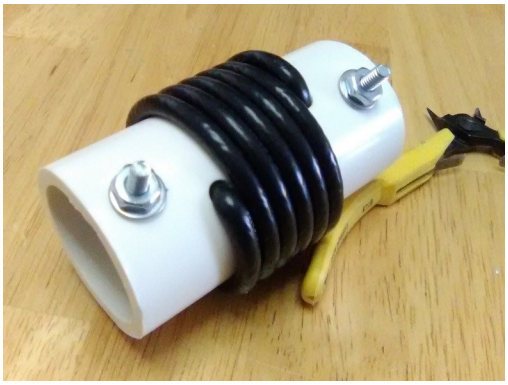
Trap dipole antenna for 20 / 40 meters

Slip a piece of heat shrink tubing over the coax B center conductor dielectric (white insulation), and twist the braid of coax A around the exposed coax B center conductor. Solder #8 ring terminals to the coax A center conductor and coax B braid, then heat-shrink the tubing.





Use #8 screws to bolt each ring terminal to its respective tube end, inside the tube. The trap is ready for use.



Element construction

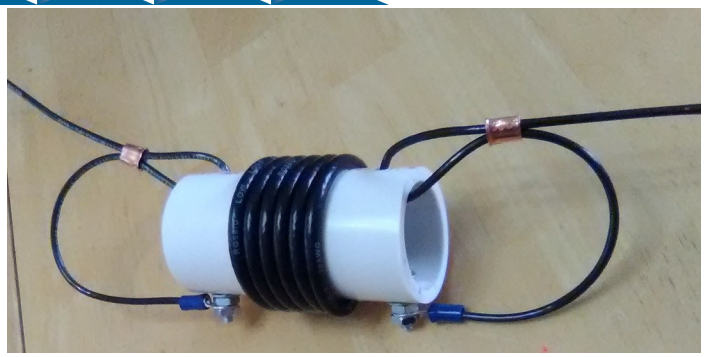
Cut two 14 AWG wires 17 feet long for the 20-meter elements, and two more 11 feet long for the 40-meter elements. Thread each 20-meter element through a crimp sleeve (or other strain-relief device), through one of the balun eye bolts, then back through the crimp sleeve. Solder a #8 ring terminal to the end of the wire exiting the crimp sleeve, fasten the ring terminal to the balun with a nut, then crimp the sleeve. Thread the other end of the 20-meter element through another crimp sleeve, through the 1/8″ strain relief hole, then back through the crimp sleeve. Measure 16 feet 5 inches between the balun eye bolt and the 1/8″ hole, then crimp the sleeve.

Thread each 40-meter element through a crimp sleeve, through one of the balun eye bolts, then back through the crimp sleeve. Solder a #8 ring terminal to the end of the wire exiting the crimp sleeve, fasten the ring terminal to the balun with a nut, then crimp the sleeve. Thread the other end of the 40-meter eminent through another crimp sleeve, through a dogbone insulator, then back through the crimp sleeve. Measure 9 feet 10 inches between the 1/8″ strain relief hole and the dogbone insulator, then crimp the sleeve.

DIY, continued

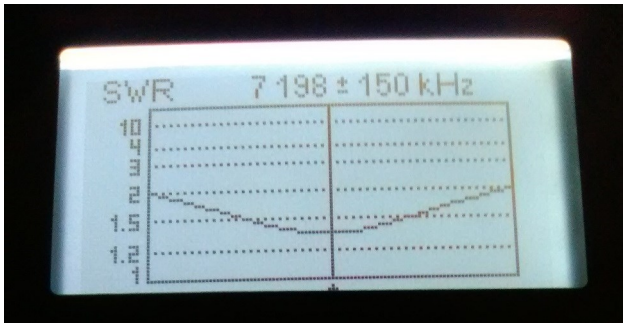
Trap dipole antenna for 20 / 40 meters

Completed balun, connected

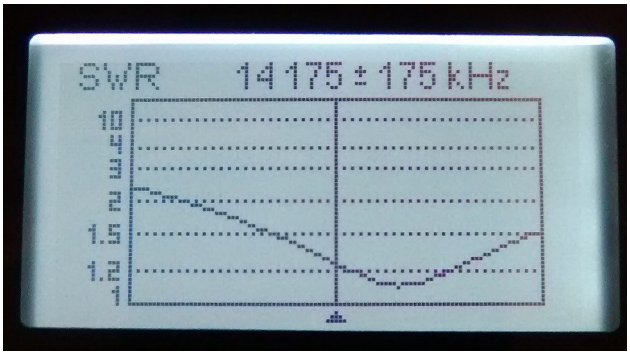


Completed trap, connected

Completed end of the antenna



40 meters is looking good



20 meters is almost as good

The final antenna ended up being about 53 feet long, which is perfect for a portable, dual-band dipole, and good for some attics.

Test time

I mounted the antenna about ten feet off the ground in a flat-top configuration. With the antenna so low to the ground, I wasn't expecting miracles, but the SWR across 40 meters turned out exceptionally well.

The results on 20 meters weren't quite as good, but weren't bad either. The entire phone portion of the 20-meter band ended up below 1.5:1 SWR, and nearly the entire band shows below 2.0:1 SWR, and the same with the 40-meter band. But keep in mind that I tested them just a few feet off the ground, so the impedances and performance will change somewhat, when I go to actually use it on the air. On the other hand, a good SWR across the bands low to the ground makes for good portable or NVIS operation.

Noji Ratzlaff, KNØJI (kn0ji@arrl.net)

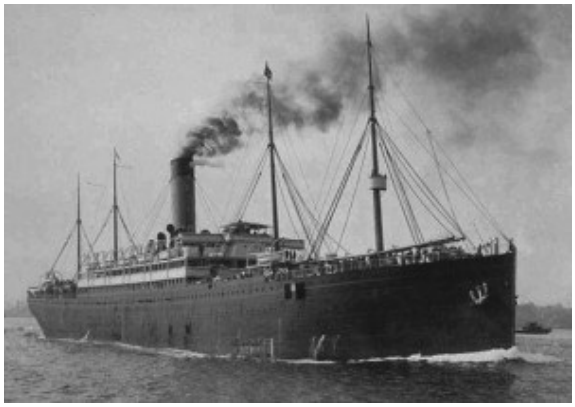
Living in the Past

Historical perspective

The first radio rescue at sea

On 23 January 1909, two ships, *Republic* of the White Star Line (owner of *Titanic*), carrying American tourists to Europe, and Lloyd Italiano liner *Florida*, carrying Italian earthquake refugees to New York, were en route for a course to destiny. The two had encountered dense fog off the island of Nantucket, Massachusetts, and had taken the normal maritime precautions of signaling approaching vessels by loud whistle. At 5:47 am, another whistle was heard, and *Republic*'s engines were ordered to full reverse. Out of nowhere, *Florida* appeared, and T-boned *Republic* in her port side.

The engine and boiler rooms of *Republic* began to flood, and the ship listed. It was outfitted with the new Marconi wireless telegraph system, and became the first ship in history to issue a *CQD* distress call (which preceded the later *SOS*). The 26-year-old telegraph operator Jack Binns bravely tapped out the distress call from his sinking ship, to all who could hear it.

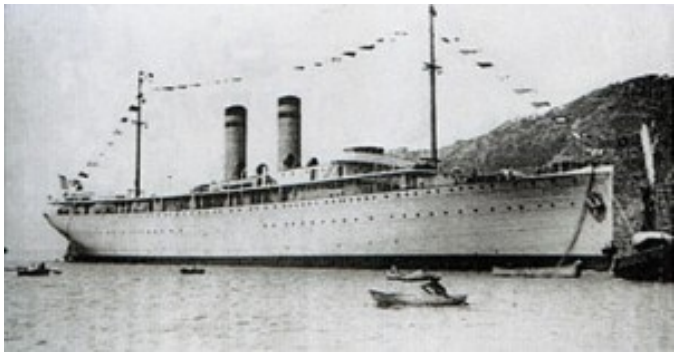


Republic

Republic's signal was detected and relayed by Nantucket Island station. Another White Star Liner *Baltic* responded to the *CQD*, and answered the call, but could not locate the damaged vessels until nearly nightfall, due to the persistent fog. The *USRC Gresham* also responded. By the following day, *Republic* sank in 270 feet of water about 50 miles to the south of Nantucket Island, in spite of all attempts to reinforce it and take it under tow.

In the end, only six people lost their lives, out of 742 on *Republic* and over 900 on *Florida*, proving the success of the new wireless telegraph technology. The wireless room was damaged in the collision, and had Jack been in the room at the time, he might also have lost his life. Jack had to retrieve working batteries from three decks below, to power the now disabled radios, and re-assemble the wiring sufficiently to make the calls for help. BTW, Jack was later asked to serve on *Titanic*, but turned down the offer.

Jack Binns, in Marconi cap



Florida

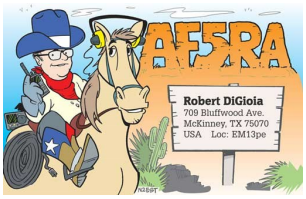
Side of Bacon

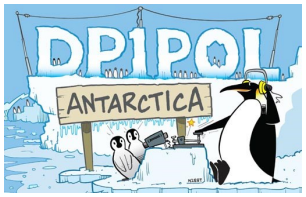
A little ham humor

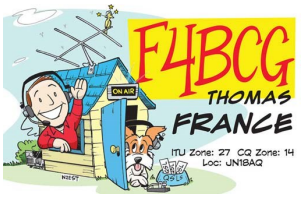
Utah Valley Amateur Radio Club
Since Feb. 2016

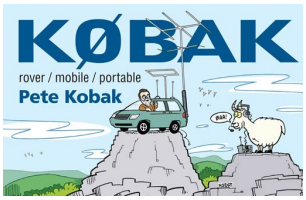
QSL cards of Jim Massara N2EST

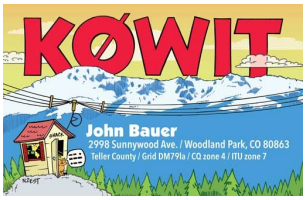
Jim no longer takes orders for new artwork, but we're privileged to highlight some of his legacy work right here

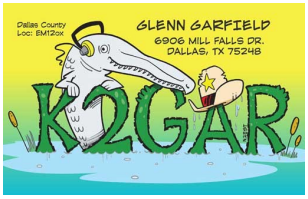


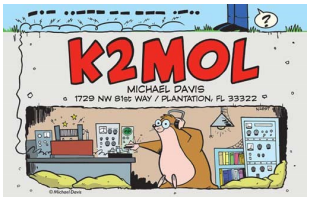


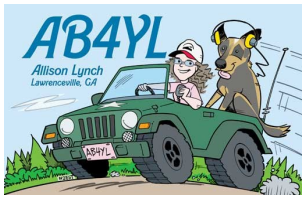


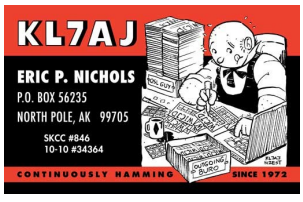


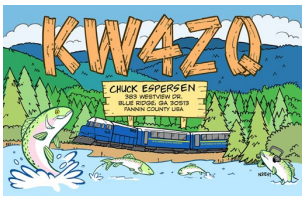


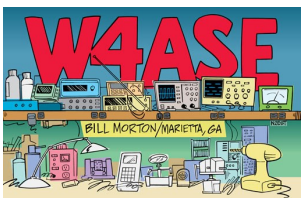


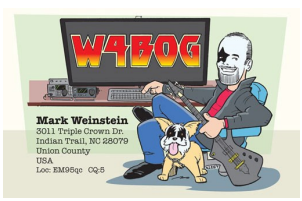












For Your Insight

Information you could use

Club meeting format

Here's the usual (non-pandemic) agenda for club meetings, at the Orem City Council Chamber Room, 56 N State St:

Talk-in frequency on the club repeaters

6:30 pm : Eyeball QSO

socialize / put faces with call signs

radio programmers available to help you

6:45 pm : Call the meeting to order

meeting lineup (agenda)

announcements / nets / awards / calendar

7:00 pm : Discussion / breakout session

discussions typically involve everybody

breakouts split into separate groups

7:45 pm : Door prizes

7:55 pm : Dismiss and disassemble

8:00 pm : *Club QSY* to a local eatery

Something you'd like to see at the meetings?

Monthly meeting help

We're grateful for the volunteers who help with various tasks that make our club night just that much more friendly and useful to everybody. Monthly, we need help with

programming radios (thanks, Loren / Ralph / Mickey!)

taking photos or videos during the meeting

operating the talk-in radio

setting up tables and chairs (thanks, Heath!)

Lynx

Websites for your education and leisure

Training items and topics for nets

Ham Radio Nets

Radio programming

76ers Group and UVARC Group pages

Utah Ham Radio Exam Schedule

Send your input to ***uvarcshack@gmail.com***

Questions of the Month

Test your knowledge (answers next page)

G1BØ1 : What is the maximum height above ground to which an antenna structure may be erected without requiring notification to the FAA and registration with the FCC, provided it is not at or near a public use airport?

A. 50 feet
B. 100 feet
C. 200 feet
D. 300 feet

E4AØ8 : Which of the following measures SWR?

A. A spectrum analyzer
B. A Q meter
C. An ohmmeter
D. An antenna analyzer

Calendar

What's happening
(times are Mountain Time)

Utah County Ham Exam Sessions

GradeCam parking lot, 495 E 1000 S, PG

Email Steve Whitehead, ***nv7v@nv7v.org***

Sat Jun 19, 1:00 pm or 2:00 pm
Sat Jul 17, 1:00 pm or 2:00 pm
Sat Aug 21, 1:00 pm or 2:00 pm
Sat Sep 18, 1:00 pm or 2:00 pm
Sat Oct 9, 1:00 pm or 2:00 pm
Sat Nov 20, 1:00 pm or 2:00 pm

Provo One-day Technician Courses*

Third Saturday Monthly at 8:00 am
BYU Law School Bldg, First Floor
** September through April*

2021 Orem Ham Radio Courses

Email Noji Ratzlaff, ***nojiratz@hotmail.com***

Extra : Tue Jul 13, 20, 27, Aug 3, 10
Technician : Tue Sep 21, 28, Oct 5, 12

Club Meeting Calendar (6:30 pm)

On Zoom, YouTube Live, and Facebook Live

June 3	July 1*
August 5	September 2
October 3	November 7
December 2*	January 6

** Potluck at the Lindon Community Center*

Regular Nets

Jackson Hole Net, Mon 8:00 pm, 146.76
UVARC Ladies' Net, Tue 7:00 pm, 146.78
DMR Utah Net, Wed 6:00 pm, TG 3149, CC 1
Utah 76'ers, Wed 7:00 pm, 146.76
Sultans of Simplex, Wed 8:00 pm, 447.825
UVARC HF Net, Wed 9:00 pm, 28.345 USB
UVARC New Ham Net, Thu 7:00 pm, 146.78
CERT Net, 2nd & 4th Thu 8:00 pm, 146.78
Utah County 6 meters, Fri 8:00 pm, 50.14
Family History Net, Sat 8:00 pm, 146.78
UVARC Family Net, Sun 3:30 pm, 146.78
See a larger list of nets at noji.com/nets

Upcoming Contests

Day of the YLs Contest
6 pm Fri May 28 to 6 pm Sun May 30

ARRL Kids Day
Noon to 6 pm Sat Jun 19

ARRL Field Day
Noon Sat Jun 26 to noon Sun Jun 27

IARU HF World Championship
6 am Fri Jul 10 to 6 am Sat Jul 11

See a larger list at contestcalendar.com

Answers to the Questions of the Month

G1BØ1 : **C** (200 feet)

E1DØ6 : **D** (An antenna analyzer)

Vendors

For your convenience

Pockrus Joystick J-pole

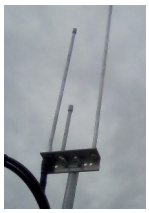
$25, open-stub aluminum half-wave, dual-band J-pole antenna

$35, 6-meter dipole, $20 for the 220 MHz (1.25 m) antenna

by Carl Pockrus, WE7OMG (email myjpoles@gmail.com to purchase)

Half-wave performance, solid construction, weather-proof, low wind-load

Probably the best-performing outdoor antenna you can get for the price



Super-Elastic Signal Stick

$20, vertical quarter-wave flexible antenna

by Richard Bateman, KD7BBC, of *SignalStuff* (and maker of *HamStudy*)

Super-performing antenna for your HT (handhold transceiver)

Visit SignalStuff and select SMA-Male, SMA-Female, or BNC

Ham Radio Podcasts v1.50

by Trevor Holyoak, AG7GX (email android@holyoak.com)

Stream podcasts (such as *100 Watts and a Wire*, *Amateur Radio Newsline*, *ARRL Audio News*, etc.) or download for later listening

For Android 4.1 and up (ad-free available for purchase)

Club Logo and Call Sign Embroidering

Want your call sign or name (or both!) embroidered on your shirt, your hoodie, your duffle? Or how about a club patch with your call sign?

by Glenna Gardner, WE7SEW (glenna0354@gmail.com or text 801-592-2503)

Call sign or name = $5, Both = $8, UVARC patch = $5, Patch with call = $9

Portable Aluminum J-pole

$49, sectioned, open-stub aluminum half-wave, dual-band J-pole antenna

by Stan, KJ7BDV and Kent, N7EKF (email skantenna@yahoo.com for info or call 801-372-7260)

Complete antenna breaks down into a compact 2″ x 6″ x 12″ package weighing only 3 lbs, perfect for backpacking and portable work where you really need a good 2-meter antenna

HamBadgers

Amateur radio name badges and other products

$10, official UVARC ham radio name badge with the club logo

Visit Ham Badgers and select Ham Radio Clubs > Utah Valley Amateur Radio Club

Email Eric Palmatier at hambadgers@gmail.com or call 919-249-8704

Where everybody knows your call sign

Utah Valley Amateur Radio Club
PO Box 1288

K7UVA
Phone/Text: 801-38-1865
Email: k7uva@arrl.net

Repeaters: 146.780–, 100.0
448.200–, 100.0 224.560–, 100.0
145.250-, 100.0 448.225-, 100.0
Newsletter input?
Email uvarcshack@gmail.com
Need help?
Email uvarcelmer@gmail.com

[See all our newsletters on uvarc.club]

We are the *Utah Valley Amateur Radio Club*, a 501(c)(3) non-profit (EIN 81-360-6416) Utah corporation that was organized in an obscure Orem fire station on 02-05-2016 to provide amateur radio enthusiasts in Utah County and surrounding areas a way to gather and discuss all things ham. Our primary purposes are to provide a local amateur radio resource, help new hams in their new-found adventures, and to give more experienced hams a reason to share their wealth of knowledge and wisdom in a friendly atmosphere of fellowship. We're an ARRL Affiliate and work in cooperation with the Utah VHF Society, but are not subsidiary to them, to ARRL, ARES, or any other organization, although many of our members and leaders might also belong to the same.

This newsletter is copyrighted and published by the Utah Valley Amateur Radio Club, and its purpose is to convey the tone and temperament of the club, to inform and entertain its members, and to entice the rest. To join, go to uvarc.club/join, then sign up at www.facebook.com/groups/uvarc/ to stay informed. For more information about our club or about amateur (ham) radio in general, please email or text or call us.

More than just a club, we invite you to become part of a great ham radio movement in Utah Valley

Our fearless leadership

Presidency

President..... Noji Ratzlaff
Vice President..... Chad Buttars
Secretary.....Caryn Alarcon
Activities..... Wendy Shoop
Technology.....Trevor Holyoak

Board of Directors

Richard Bateman, KD7BBC
Carl Pockrus, WE7OMG
Aubrey Mikkelsen, K7GUM
Jeff McGrath, N1SC
Jody Dollar, K7BUX
Jeremy Giovannoni, K7TEH
Brad Kirk, AF7FP
Alma Perry, W1ZGY
Loren Chandler, WB1KE
James Brown, W7JHB
Harry English, AA1HE

Club Sponsor

Heath Stevenson
Orem City Emergency Manager

From all of us to you, 73